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# Remarks on Nominalization[1]

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For the purposes of this paper, I will assume without question a certain framework of principles and will explore some of the problems that arise when they are applied in the study of a central area of the syntax of English, and, presumably, any human language.[2]

A person who has learned a language has acquired a system of rules that relate sound and meaning in a certain specific way. He has, in other words, acquired a certain competence that he puts to use in producing and understanding speech. The central task of descriptive linguistics is to construct grammars of specific languages, each of which seeks to characterize in a precise way the competence that has been acquired by a speaker of this language. The theory of grammar attempts to discover the formal conditions that must be satisfied by a system of rules that qualifies as the grammar of a human language, the principles that govern the empirical interpretation of such a system, and the factors that determine the selection of a system of the appropriate form on the basis of the data available to the language learner. Such a "universal grammar" (to modify slightly a traditional usage) prescribes a schema that defines implicitly the infinite class of "attainable grammars"; it formulates principles that determine how each such system relates sound and meaning; it provides a procedure of evaluation for grammars of the appropriate form. Abstractly, and under a radical but quite useful idealization, we may then think of language-learning as the process of selecting a grammar of the appropriate form that relates sound and meaning in a way consistent with the available data and that is valued as highly, in terms of the evaluation measure, as any grammar meeting these empirical conditions.

I will assume that a grammar contains a base consisting of a categorial component (which I will assume to be a context-free grammar) and a lexicon. The lexicon consists of lexical entries, each of which is a system of specified



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features. The nonterminal vocabulary of the context-free grammar is drawn from a universal and rather limited vocabulary, some aspects of which will be considered below. The context-free grammar generates phrase-markers, with a dummy symbol as one of the terminal elements. A general principle of lexical insertion permits lexical entries to replace the dummy symbol in ways determined by their feature content. The formal object constructed in this way is a *deep structure.* The grammar contains a system of transformations, each of which maps phrase-markers into phrase-markers. Application of a sequence of transformations to a deep structure, in accordance with certain universal conditions and certain particular constraints of the grammar in question, determines ultimately a phrase-marker which we call a *surface structure.* The base and the transformational rules constitute the syntax. The grammar contains phonological rules that assign to each surface structure a phonetic representation in a universal phonetic alphabet. Furthermore, it contains semantic rules that assign to each paired deep and surface structure generated by the syntax a semantic interpretation, presumably, in a universal semantics, concerning which little is known in any detail. I will assume, furthermore, that grammatical relations are defined in a general way in terms of configurations within phrase-markers and that semantic interpretation involves only those grammatical relations specified in deep structures (although it may also involve certain properties of surface structures). I will be concerned here with problems of syntax exclusively; it is clear, however, that phonetic and semantic considerations provide empirical conditions of adequacy that must be met by the syntactic rules.

As anyone who has studied grammatical structures in detail is well aware, a grammar is a tightly organized system; a modification of one part generally involves widespread modifications of other facets. I will make various tacit assumptions about the grammar of English, holding certain parts constant and dealing with questions that arise with regard to properties of other parts of the grammar.

In general, it is to be expected that enrichment of one component of the grammar will permit simplification in other parts. Thus certain descriptive problems can be handled by enriching the lexicon and simplifying the categorial component of the base, or conversely; or by simplifying the base at the cost of greater complexity of transformations, or conversely. The proper balance between various components of the grammar is entirely an empirical issue. We have no a priori insight into the "trading relation" between the various parts. There are no general considerations that settle this matter. In particular, it is senseless to look to the evaluation procedure for the correct answer. Rather, the evaluation procedure must itself be selected on empirical grounds so as to provide whatever answer it is that is correct. It would be pure dogmatism to maintain, without empirical evidence, that the categorial component, or the lexicon, or the transformational component must be nar-

rowly constrained by universal conditions, the variety and complexity of language being attributed to the other components.

Crucial evidence is not easy to obtain, but there can be no doubt as to the empirical nature of the issue. Furthermore, it is often possible to obtain evidence that is relevant to the correct choice of an evaluation measure and hence, indirectly, to the correct decision as to the variety and complexity that universal grammar permits in the several components of the grammar.[3]

To illustrate the problem in an artificially isolated case, consider such words as *feel*, which, in surface structure, take predicate phrases as complements. Thus we have such sentences as:

(1) **John felt angry (sad, weak, courageous, above such things, inclined to agree to their request, sorry for what he did, etc.).**

We might introduce such expressions into English grammar in various ways. We might extend the categorial component of the base, permitting structures of the form noun phrase–verb–predicate, and specifying *feel* in the lexicon as an item that can appear in prepredicate position in deep structures. Alternatively, we might exclude such structures from the base, and take the deep structures to be of the form noun phrase–verb–sentence, where the underlying structure *John felt* $[_S$*John be sad*$]_S$[4] is converted to *John felt sad* by a series of transformations. Restricting ourselves to these alternatives for the sake of the illustrative example, we see that one approach extends the base, treating *John felt angry* as a NP–V–Pred expression roughly analogous to *his hair turned gray* or *John felt anger* (NP–V–NP), while the second approach extends the transformational component, treating *John felt angry* as a NP–V–S expression roughly analogous to *John believed that he would win* or *John felt that he was angry*. A priori considerations give us no insight into which of these approaches is correct. There is, in particular, no a priori concept of "evaluation" that informs us whether it is "simpler," in an absolute sense, to complicate the base or the transformation.

There is, however, relevant empirical evidence, namely, regarding the semantic interpretation of these sentences.[5] To feel angry is not necessarily to feel that one is angry or to feel oneself to be angry; the same is true of most of the other predicate expressions that appear in such sentences as (1). If we are correct in assuming that it is the grammatical relations of the deep structure that determine the semantic interpretation, it follows that the deep structure of (1) must not be of the NP–V–S form, and that, in fact, the correct solution is to extend the base. Some supporting evidence from syntax is that many sentences of the form (1) appear with the progressive aspect (*John is feeling angry*, like *John is feeling anger*, etc.), but the corresponding sentences of the form NP–V–S do not (* *John is feeling that he is angry*). This small amount of syntactic and semantic evidence therefore suggests that the evaluation procedure must be selected in such a way as to prefer an elaboration of the base to an elaboration of the transformational component in such a case as this. Of course this empirical hypothesis is extremely strong; the evaluation procedure is a part of universal grammar, and when made precise, the proposal of the preceding sentence will have large-scale effects in the grammars of all languages, effects which must be tested against the empirical evidence exactly as in the single case just cited.



This paper will be devoted to another example of the same general sort, one that is much more crucial for the study of English structure and of linguistic theory as a whole.

Among the various types of nominal expressions in English there are two of particular importance, each roughly of propositional form. Thus corresponding to the sentences of (2) we have the gerundive nominals of (3) and the derived nominals of (4):[6]

(2) a. **John is eager to please.**
b. **John has refused the offer.**
c. **John criticized the book.**

(3) a. **John's being eager to please**
b. **John's refusing the offer**
c. **John's criticizing the book**

(4) a. **John's eagerness to please**
b. **John's refusal of the offer**
c. **John's criticism of the book**

Many differences have been noted between these two types of nominalization. The most striking differences have to do with the productivity of the process in question, the generality of the relation between the nominal and the associated proposition, and the internal structure of the nominal phrase.

Gerundive nominals can be formed fairly freely from propositions of subject–predicate form, and the relation of meaning between the nominal and the proposition is quite regular. Furthermore, the nominal does not have the internal structure of a noun phrase; thus we cannot replace *John's* by any determiner (e.g., *that*, *the*) in (3), nor can we insert adjectives into the gerundive nominal. These are precisely the consequences that follow, without elaboration or qualifications, from the assumption that gerundive nominalization involves a grammatical transformation from an underlying sentencelike structure. We might assume that one of the forms of NP introduced by rules of the categorial component of the base is (5), and that general rules of affix placement give the freely generated surface forms of the gerundive nominal:[7]

(5) $[_S$NP *nom* (Aspect) VP$]_S$

The semantic interpretation of a gerundive nominalization is straightforward in terms of the grammatical relations of the underlying proposition in the deep structure.

Derived nominals such as (4) are very different in all of these respects. Productivity is much more restricted, the semantic relations between the associated proposition and the derived nominal are quite varied and idiosyncratic, and the nominal has the internal structure of a noun phrase. I will comment on these matters directly. They raise the question of whether the derived nominals are, in fact, transformationally related to the associated propositions. The question, then, is analogous to that raised earlier concerning the status of verbs such as *feel*. We might extend the base rules to accommodate the derived nominal directly (I will refer to this as the "lexicalist position"), thus simplifying the transformational component; or, alternatively, we might simplify the base structures, exluding these forms, and derive them by some extension of the transformational apparatus (the "transformationalist position"). As in the illustrative example discussed earlier, there is no a priori insight into universal grammar — specifically, into the nature of an evaluation measure — that bears on this question, which is a purely empirical one. The problem is to find empirical evidence that supports one or the other of the alternatives. It is, furthermore, quite possible to imagine a compromise solution that adopts the lexicalist position for certain items and the transformationalist position for others. Again, this is entirely an empirical issue. We must fix the principles of universal grammar — in particular, the character of the evaluation measure — so that it provides the description that is factually correct, noting as before that any such hypothesis about universal grammar must also be tested against the evidence from other parts of English grammar and the grammars of other languages.

In the earliest work on transformational grammar [cf. Lees (1960)], the correctness of the transformationalist position was taken for granted; and, in fact, there was really no alternative as the theory of grammar was formulated at that time. However, the extension of grammatical theory to incorporate syntactic features [as in Chomsky (1965, Chapter 2)] permits a formulation of the lexicalist position, and therefore raises the issue of choice between the alternatives.[8] My purpose here is to investigate the lexicalist position and to explore some of the consequences that it suggests for the theory of syntax more generally.

Consider first the matter of productivity. As noted above, the transformation that gives gerundive nominals applies quite freely.[9] There are, however, many restrictions on the formation of derived nominals. The structures underlying (6), for example, are transformed to the gerundive nominals of (7) but not to the derived nominals of (8):

(6) a. John is easy (difficult) to please.
 b. John is certain (likely) to win the prize.
 c. John amused (interested) the children with his stories.

(7) a. John's being easy (difficult) to please
 b. John's being certain (likely) to win the prize
 c. John's amusing (interesting) the children with his stories



(8) a. * John's easiness (difficulty) to please
 b. * John's certainty (likelihood) to win the prize
 c. * John's amusement (interest) of the children with his stories

There are, of course, derived nominals that superficially resemble those of (8), for example, those of (9), which pair with the gerundive nominals of (10):

(9) a. John's eagerness to please [(2a), (4a)]
 b. John's certainty that Bill will win the prize
 c. John's amusement at (interest in) the children's antics

(10) a. John's being eager to please [(2a), (3a)]
 b. John's being certain that Bill will win the prize
 c. John's being amused at (interested in) the children's antics

These discrepancies between gerundive and derived nominals call for explanation. Specifically, we must determine why the examples of (8) are ruled out although those of (9) are permitted.[10]

The idiosyncratic character of the relation between the derived nominal and the associated verb has been so often remarked that discussion is superfluous. Consider, for example, such nominals as *laughter, marriage, construction, actions, activities, revolution, belief, doubt, conversion, permutation, trial, residence, qualifications, specifications*, and so on, with their individual ranges of meaning and varied semantic relations to the base forms. There are a few subregularities that have frequently been noted, but the range of variation and its rather accidental character are typical of lexical structure. To accommodate these facts within the transformational approach (assuming, as above, that it is the grammatical relations in the deep structure that determine meaning) it is necessary to resort to the artifice of assigning a range of meanings to the base form, stipulating that with certain semantic features the form must nominalize and with others it cannot. Furthermore, the appeal to this highly unsatisfactory device, which reduces the hypothesis that transformations do not have semantic content to near vacuity, would have to be quite extensive.[11]

The third major difference noted above between gerundive and derived nominals is that only the latter have the internal structure of noun phrases. Thus we can have such expressions as *the proof of the theorem* (* *the proving the theorem*, with a gerundive nominal), *John's unmotivated criticism of the book* (* *John's unmotivated criticizing the book*), and so on. Correspondingly, the derived nominals cannot contain aspect; there is no derived nominal analogous to *John's having criticized the book*. Furthermore, many derived nominals pluralize and occur with the full range of determiners (*John's three proofs of the theorem, several of John's proofs of the theorem*, etc.). And derived nominals, in fact, can appear freely in the full range of noun phrase structures. For example, the sentence *John gave Bill advice* is just like any other indirect object structure in that it has the double passive[*advice was*

*given* (*to*) *Bill, Bill was given advice*]. It is difficult to see how a transformational approach to derived nominals can account for the fact that the structures in which they appear as well as their internal structure and, often, morphological properties, are those of ordinary noun phrases. None of these problems arises, as noted earlier, in the case of gerundive nominals.

These properties of derived nominals are quite consistent with a lexicalist approach and, in part, can even be explained from this point of view. Before going into this matter, let us elaborate the lexicalist position in slightly greater detail.

I noted earlier that the lexicalist position was not formulable within the framework of syntactic theory available at the time of Lees's work on nominalizations. The problem was that the obvious generalizations concerning the distributional properties of the base and derived forms were expressible, in that framework, only in terms of grammatical transformations. There was no other way to express the fact that the contexts in which *refuse* appears as a verb and *refusal* as a noun are closely related. However, when the lexicon is separated from the categorial component of the base and its entries are analyzed in terms of contextual features, this difficulty disappears. We can enter *refuse* in the lexicon as an item with certain fixed selectional and strict subcategorization features, which is free with respect to the categorial features [noun] and [verb]. Fairly idiosyncratic morphological rules will determine the phonological form of *refuse, destroy,* etc., when these items appear in the noun position. The fact that *refuse* takes a noun phrase complement or a reduced sentential complement and *destroy* only a noun phrase complement, either as a noun or as a verb, is expressed by the feature structure of the "neutral" lexical entry, as are selectional properties. Details aside, it is clear that syntactic features provide a great deal of flexibility for the expression of generalizations regarding distributional similarities. Hence what was a decisive objection to the lexicalist position no longer has any force.

Let us propose, then, as a tentative hypothesis, that a great many items appear in the lexicon with fixed selectional and strict subcategorization features, but with a choice as to the features associated with the lexical categories noun, verb, adjective. The lexical entry may specify that semantic features are in part dependent on the choice of one or another of these categorial features. This is, of course, the typical situation within the lexicon; in general, lexical entries involve certain Boolean conditions on features, expressing conditional dependencies of various sorts.[12] Insofar as there are regularities (cf. Note 11), these can be expressed by redundancy rules in the lexicon.

Consider now the problem of productivity noted above, specifically, the fact that we cannot form the derived nominals (8) corresponding to the sentences (6), although the structures underlying (6) can be transformed to the gerundive nominals (7), and we can form the derived nominals (9) associated with the gerundive nominals (10).



Consider first the examples *John is easy to please, John is eager to please,* only the second of which is associated with a derived nominal. This consequence follows immediately from the lexicalist hypothesis just formulated, when we take into account certain properties of the items *eager* and *easy*. Thus *eager* must be introduced into the lexicon with a strict subcategorization feature indicating that it can take a sentential complement, as in *John is eager* (*for us*) *to please*. In the simplest case, then, it follows that in the noun position, *eager* will appear in the contexts *John's eagerness* (*for us*) *to please,* etc., with no further comment necessary. But *easy* (or *difficult*) does not appear in the lexicon with such a feature. There is no structure of the form . . . *easy* (*difficult*) *S* generated by base rules. Rather, *easy* (*difficult*) appears in base phrase-markers as an adjective predicated of propositions as subject [(*for us*) *to please John is easy,* etc.]; forms such as *it is easy* (*for us*) *to please John* are derived by extraposition.[13] Consequently, *easy* (or *difficult*) cannot be introduced by lexical insertion into the noun position with sentential complements, and we cannot derive such forms as (8a), **John's easiness* (*difficulty*) *to please.* No such restriction holds for gerundive nominalization, which, being a transformation, is applicable to transforms as well as to base phrase-markers.

Consider next the examples **John's certainty to win the prize* [=(8b)], *John's certainty that Bill will win the prize* [=(9b)]. Again, the lexicalist hypothesis provides an explanation for this distinction between the two senses of *certain.* The sentence *John is certain to win the prize* is derived by extraposition and pronoun replacement from a deep structure in which *certain* is predicated of the proposition *John — to win the prize,* as is clear from the meaning.[14] In this sense, *certain* does not permit a propositional complement; it therefore follows from the lexicalist hypothesis that there cannot be a derived nominal *certainty to win the prize,* in this sense. But *John is certain that Bill will win the prize derives* from *John is certain* $[_S$ *Bill will win the prize*$]_S$. In the sense of *certain* in which it is predicated of a person, a propositional complement can be adjoined in the base. Consequently, the lexicalist hypothesis permits the associated derived nominal *John's certainty that Bill will win the prize,* generated by lexical insertion of *certain* in the noun position before a sentential complement.

Consider now examples (6c) through (10c). If derived nominals are formed by transformation, there is no reason why * *John's amusement of the children with his stories* [=(8c)] should not be formed from the proposition that underlies the gerundive nominal *John's amusing the children with his stories,* just as *John's amusement at the children's antics* [=(9c)] would, on these grounds, be derived from the proposition that underlies the gerundive nominal *John's being amused at the children's antics* [=(10c)]. The discrepancy would be accounted for if we were to adopt the lexicalist position and, furthermore, to postulate that such sentences as *John amused the children with his stories* are themselves derived from an underlying structure of a different

sort. The latter assumption is not unreasonable. Thus it is well-known that among the properties of verbs of the category of *amuse, interest,* etc., is the fact that there are paired sentences such as (11):

(11) a. He was amused at the stories.
b. The stories amused him.

The facts regarding derived nominals suggest that (11b) is derived from a structure that involves (11a); this would account for the similarities in semantic interpretation and distributional properties of (11a) and (11b), and would also, on the lexicalist hypothesis, account for the occurrence and nonoccurrence of derived nominals.[15] Although independent motivation for the assumption that (11a) underlies (11b) is weak, there appears to be no counterevidence suggesting that (11b) underlies (11a). One might, for example, derive (11b) quite plausibly from a "causative" construction with roughly the form of (12):

(12) The stories [+cause] [$_S$he was amused at the stories]$_S$

I return to such structures briefly below. There is some evidence in support of the assumption that a causative construction exists in English [cf. Chomsky (1965, p. 180); Lakoff (1965, Section 9)],[16] and the operation that erases the repeated noun phrase in the embedded proposition of (12) is of a sort found elsewhere, for example, in the derivation of such sentences as *John used the table to write on, John used the pen to write* (*with*), *John used the wall to lean the table against,* etc., from *John used the table* [$_S$*John wrote on the table*]$_S$, and so on.

Other examples for which a causative analysis has been suggested fall into the same pattern, with respect to formation of derived nominals. Consider, for example, the transitive use of *grow* as in *John grows tomatoes,* which might plausibly be derived from a structure such as (12), with *the stories* replaced by *John* in the subject position and the embedded proposition being the intransitive *tomatoes grow.* But consider the nominal phrase *the growth of tomatoes.* This is unambiguous; it has the interpretation of *tomatoes grow* but not of *John grows tomatoes.* If the latter is taken as a base form, there should be an associated derived nominal *the growth of tomatoes* with the same interpretation, just as we have the derived nominal *the rejection of the offer* associated with the transitive verb phrase *reject the offer.* If, on the other hand, the sentence *John grows tomatoes* is derived from a causative construction, the corresponding derived nominal is excluded (though not, of course, the corresponding nominalization *the growing of tomatoes* — we return to nominalizations of this type on p. 214). Hence the lack of ambiguity offers empirical support for a combination of the lexicalist hypothesis with the causative analysis, though not for either of these assumptions taken in isolation.

Summarizing these observations, we see that the lexicalist hypothesis explains a variety of facts of the sort illustrated by examples (6) through (10) [in part, in conjunction with other assumptions about underlying structures, such as (12)]. The transformationalist hypothesis is no doubt consistent with these facts, but it derives no support from them, since it would also be consistent with the discovery, were it a fact, that derived nominals exist in all cases in which we have gerundive nominals. Hence the facts that have been cited give strong empirical support to the lexicalist hypothesis and no support to the transformationalist hypothesis. Other things being equal, then, they would lead us to accept the lexicalist hypothesis, from which these facts follow.



If the lexicalist hypothesis is correct, we should expect that derived nominals will correspond to base structures rather than transforms. I will return to some problems, which may or may not be real, that arise in connection with this consequence of the lexicalist hypothesis. Notice, however, that there is other corroborating evidence. For example, there are many verbs in English that must be listed in the lexicon as verb–particle constructions [*look up* (*the information*), *define away* (*the problem*), etc.]. These forms undergo gerundive nominalization freely (*his looking up the information, his looking the information up, his defining away the problem, his defining the problem away*). The derived nominals, in general, are rather marginal, and hence not very informative. However, it seems to me that the forms of (13) are somewhat preferable to those of (14.)[17]

(13) a. his looking up of the information
b. his defining away of the problem

(14) a. * his looking of the information up
b. * his defining of the problem away

This consequence follows from the lexicalist assumption, if the forms of (13) are regarded as derived nominals (see Note 17).

Notice also that although gerundive nominalization applies freely to sentences with verb phrase adjuncts, this is not true of the rules for forming derived nominals. Thus we have (15) but not (16):[18]

(15) his criticizing the book before he read it (because of its failure to go deeply into the matter, etc.)

(16) * his criticism of the book before he read it (because of its failure to go deeply into the matter, etc.)

This too would follow from the lexicalist assumption, since true verb phrase adjuncts such as *before*-clauses and *because*-clauses will not appear as noun complements in base noun phrases.

The examples (15) and (16) raise interesting questions relating to the matter of acceptability and grammaticalness.[19] If the lexicalist hypothesis is correct, then all dialects of English that share the analysis of adjuncts presupposed above should distinguish the expressions of (15), as directly generated by

the grammar, from those of (16), as not directly generated by the grammar. Suppose that we discover, however, that some speakers find the expressions of (16) quite acceptable. On the lexicalist hypothesis, these sentences can only be derivatively generated. Therefore we should have to conclude that their acceptability to these speakers results from a failure to take note of a certain distinction of grammaticalness. We might propose that the expressions of (16) are formed by analogy to the gerundive nominals (15), say by a rule that converts *X -ing* to the noun *X nom* (where *nom* is the element that determines the morphological form of the derived nominal) in certain cases. There is no doubt that such processes of derivative generation exist as part of grammar in the most general sense (for some discussion, see *Aspects*, Chapter IV, Section 1, and references cited there). The question is whether in this case it is correct to regard (16) as directly generated or as derivatively generated, for the speakers in question. There is empirical evidence bearing on this matter. Thus if the expressions of (16) are directly generated, we would expect them to show the full range of use and meaning of such derived nominals as *his criticism of the book*. If, on the other hand, they are derivatively generated in the manner just suggested, we would expect them to have only the more restricted range of use and meaning of the expressions of (15) that underlie them. Crucial evidence, then, is provided by the contexts (17) in which the derived nominal *his criticism of the book* can appear, but not the gerundive nominals (15) (with or without the adjunct):

(17) a. — is to be found on page 15.
b. I studied — very carefully.

The fact seems to be that speakers who accept (16) do not accept (18) though they do accept (19):

(18) a. *His criticism of the book before he read it* is to be found on page 15.
b. I studied *his criticism of the book before he read it* very carefully.

(19) a. *His criticism of the book* is to be found on page 15.
b. I studied *his criticism of the book* very carefully.

If correct, this indicates that speakers who fail to distinguish (16) from (15) are not aware of a property of their internalized grammar, namely, that it generates (16) only derivatively, by analogy to the gerundive nominal. It would not be in the least surprising to discover that some speakers fail to notice a distinction of this sort. As we see, it is an empirical issue, and there is relevant factual evidence. This is a general problem that must be borne in mind when acceptability judgments are used, as they must be, to discover the grammar that is internalized. In the present instance, the lexicalist hypothesis receives convincing support if it is true that there are fundamentally two types of acceptability judgment: the first, acceptance of (19) but neither (16) nor (18); the second, acceptance of (19) and (16) but not (18). It is difficult to see how the transformationalist hypothesis could accommodate either of these cases.



Returning to the main theme, notice that aspect will of course not appear in noun phrases and therefore, on the lexicalist hypothesis, will be absent from derived nominals (though not gerundive nominals).

Consider next the adjectives that appear with derived nominals, as in *John's sudden refusal* or *John's obvious sincerity*. Two sources immediately suggest themselves: one, from relatives (as *John's aged mother* might be derived from *John's mother, who is aged*); another, from adverbial constructions such as *John refused suddenly, John is obviously sincere*. The latter assumption, however, would presuppose that derived nominals can be formed from such structures as *John refused in such-and-such a manner, John was sincere to such-and-such an extent*, etc. This is not the case, however. We cannot have * *John's refusal in that manner* (*in a manner that surprised me*) or * *John's sincerity to that extent*. Furthermore, adjectives that appear with derived nominals often cannot appear (as adverbs) with the associated verbs: for example, we have *John's uncanny* (*amazing, curious, striking*) *resemblance to Bill* but not * *John resembled Bill uncannily* (*amazingly, curiously, strikingly*). We might propose to account for this by deriving *John's uncanny resemblance to Bill* from something like *the degree to which John resembles Bill, which is uncanny*. But this proposal, apart from the difficulty that it provides no way to exclude such phrases as * *their amazing destruction of the city* from *the degree to which they destroyed the city, which was amazing*, also runs into the difficulties of Note 11. Though there remain quite a number of interesting problems concerning adjectives in derived nominal (and many other) constructions, I see nothing that conflicts with the lexicalist hypothesis in this regard.

Evidence in favor of the lexicalist position appears to be fairly substantial. It is important, therefore, to look into the further consequences of this position, and the difficulties that stand in the way of incorporating it into the theory of syntax.

Suppose that such phrases as *eagerness* (*for John*) *to please, refusal of the offer, belief in a supreme being*, etc., are base noun phrases. Clearly, if this approach is to be pursued, then the rules of the categorial component of the base must introduce an extensive range of complements within the noun phrase, as they do within the verb phrase and the adjective phrase. As a first approximation, to be revised later on, we might propose that the rules of the categorial component include the following:

(20) a. NP → N Comp
b. VP → V Comp
c. AP → A Comp

(21) Comp → NP, S, NP S, NP Prep-P, Prep-P Prep-P, etc.

Is there any independent support, apart from the phenomena of derived nominalization, for such rules? An investigation of noun phrases shows that there is a good deal of support for a system such as this.

Consider such phrases as the following:[20]

(22) a. the *weather* in England
b. the *weather* in 1965
c. the *story* of Bill's exploits
d. the *bottom* of the barrel
e. the *back* of the room
f. the *message* from Bill to Tom about the meeting
g. a *war* of aggression against France
h. *atrocities* against civilians
i. the *author* of the book
j. John's *attitude* of defiance towards Bill
k. his *advantage* over his rivals
l. his *anguish* over his crimes
m. his *mercy* toward the victims
n. a *man* to do the job
o. a *house* in the woods
p. his *habit* of interrupting
q. the *reason* for his refusal
r. the *question* whether John should leave
s. the *prospects* for peace
t. the *algebra* of revolution
u. *prolegomena* to any future metaphysics
v. my *candidate* for a trip to the moon
w. a *nation* of shopkeepers

In each of these, and many similar forms, it seems to me to make very good sense — in some cases, to be quite necessary — to regard the italicized form as the noun of a determiner–noun–complement construction which constitutes a simple base noun phrase. The only alternative would be to regard the whole expression as a transform with the italicized element being a nominalized verb or adjective, or to take the complement to be a reduced relative clause. In such cases as those of (22), neither alternative seems to be at all motivated, although each has been proposed for certain of these examples. Space prevents a detailed analysis of each case, but a few remarks may be useful.

The analysis of the head noun as a nominalized verb requires that we establish abstract verbs that are automatically subject to nominalization. This requires devices of great descriptive power which should, correspondingly, be very "costly" in terms of a reasonable evaluation measure.[21] Nevertheless, it is an interesting possibility. Perhaps the strongest case for such an approach is the class of examples of which (22i) is an example. It has been argued, quite plausibly, that such phrases as *the owner of the house* derive from underlying structures such as *the one who owns the house;* correspondingly (22i) might be derived from the structure *the one who *auths the book, *auth* being postulated as a verb that is lexically marked as obligatorily subject to nominalization. However, the plausibility of this approach diminishes when one recognizes that there is no more reason to give this analysis for (22i) than there is for *the general secretary of the party, the assistant vice-chancellor of the university,* and similarly for every function that can be characterized by a nominal phrase. Another fact sometimes put forth in support of the analysis of these phrases as nominalizations is the ambiguity of such expressions as *good dentist* (*dentist who is a good man, man who is good as a dentist*). But this argument is also quite weak. The ambiguity, being characteristic of all expressions that refer to humans by virtue of some function that they fulfill, can be handled by a general principle of semantic interpretation; furthermore, it is hardly plausible that the ambiguity of *good assistant vice-chancellor* should be explained in this way.



For some of the cases of (22), an analysis in terms of reduced relatives is plausible; for example, (22o). But even for such cases there are difficulties in this approach. Notice that there are narrow restrictions on the head noun in (22o). Thus we have the phrase *John's house in the woods* meaning *the house of John's which is in the woods;* but we cannot form *John's book* (*dog, brother, . . .*) *in the woods* (*on the table, . . .*). If John and I each have a house in the woods, I can refer to his, with contrastive stress on *John's,* as *JOHN'S house in the woods;* if we each have a book on the table, I cannot, analogously, refer to his as *JOHN'S book on the table.* Such observations suggest that the surface structure of *John's house in the woods* is *John's — house in the woods,* with *house in the woods* being some sort of nominal expression. On the other hand, in a true reduced relative such as *that book on the table,* there is, presumably, no main constituent break before *book.*

The analysis as a reduced relative is also possible in the case of (22r) and (22s). Thus we have such sentences as (23), with the associated noun phrases of (24):

(23) a. The question is whether John should leave.
b. The prospects are for peace.
c. The plan is for John to leave.
d. The excuse was that John had left.

(24) a. the question whether John should leave
b. the prospects for peace
c. the plan for John to leave
d. the excuse that John had left

Despite the unnaturalness of relative clauses formed in the usual way with (23) as the embedded proposition, one might argue that these are the sources of (24), as reduced relatives. Alternatively, one might argue that the sentences

of (23) are derived from structures incorporating (24). The latter assumption is far more plausible however. Thus there are no such sentences as (25):

(25) a. * The question whether John should leave is why Bill stayed.
b. * The prospects for peace are for a long delay.
c. * The plan for John to leave is that Bill should stay.
d. * The excuse that John had left was that Bill should stay.

Under the reduced relative assumption, there is no reason why (25) should be ruled out. This would be explained, however, if we assumed that such sentences as (23) are derived from structures incorporating the base noun phrases (24); for example, it might be proposed that (23) derives from (26) by replacement of the unspecified predicate Δ by the complement of the subject noun:

(26) $[_{NP}$ Det N Comp $]_{NP}$ be $[_{Pred}\ \Delta]_{Pred}$[22]

Under this analysis, the copula serves as a kind of existential operator. Structures such as (26) are motivated by other data as well; for example, as the matrix structure for such sentences as *what John did was hurt himself,* which might be derived from $[_{NP}$ *it that John hurt John*$]_{NP}$ be $[_{Pred}\ \Delta]_{Pred}$, through a series of operations to which we return below. In any event, there is an argument for taking the forms of (24) to underlie (23), rather than conversely.

The structures (22), and others like them, raise many problems; they do, however, suggest quite strongly that there are base noun phrases of the form determiner–noun–complement, quite apart from nominalizations. In fact, the range of noun complements seems almost as great as the range of verb complements, and the two sets are remarkably similar. There is also a wide range of adjective complements [*eager (for Bill) to leave, proud of John,* etc.]. Therefore, it is quite natural to suppose that the categorial component of the base contains rules with the effect of (20), (21), a conclusion which lends further support to the lexicalist assumption.

These observations, incidentally, considerably weaken the argument that verb and adjective are subcategories of a category "predicator," as has been suggested in recent syntactic work.[23] The argument based on distributional similarities of verbs and adjectives collapses when we recognize that nouns share the same distributional properties; thus the properties are simply properties of lexical categories. A number of other arguments that have appeared in support of this proposal fail for a similar reason. Thus it has been argued that verbs and adjectives can both be categorized as stative–active, so that we have such sentences as (27) in the case of actives, but not (28) in the case of statives:[24]

(27) a. Look at the picture.
b. Don't be noisy.
c. What I'm doing is looking at the picture.
d. What I'm doing is being noisy.
e. I'm looking at the picture.
f. I'm being noisy.

(28) a. * Know that Bill went there.
b. * Don't be tall.
c. * What I'm doing is knowing that Bill went there.
d. * What I'm doing is being tall.
e. * I'm knowing that Bill went there.
f. * I'm being tall.



At best, the logic of this argument is unclear. Suppose it were true that just verbs and adjectives crossclassify with respect to the feature active–stative. It would not follow that verbs and adjectives belong to a single category, predicator, with the feature [±adjectival] distinguishing verbs and adjectives. From the fact that a feature $[\pm F]$ is distinctive in the categories $X$, $Y$, it does not follow that there is a feature $G$ such that $X = [+G]$ and $Y = [-G]$, and a category $Z = [\pm G]$. What is more, nouns are subdivided in an exactly parallel way. Thus alongside (27) we have *be a hero, what he's doing is being a hero, he's being a hero;* alongside of (28) we must exclude * *be a person,* * *what he's doing is being a person,* * *he's being a person,* etc. Again, the property in question is a property of lexical categories; the fact that the lexical categories noun, verb, and adjective share this property does not imply that they belong to a super-category. In fact, there is, to my knowledge, no convincing argument for a category including just verbs and adjectives (or, to take another traditional view, nouns and adjectives), although it is not excluded that some such subdivision may be correct. It is quite possible that the categories noun, verb, adjective are the reflection of a deeper feature structure, each being a combination of features of a more abstract sort. In this way, the various relations among these categories might be expressible. For the moment, however, this is hardly clear enough even to be a speculation.

Returning to the main theme, a good case can be made that the lexical categories noun, adjective, and verb (whatever their further substructure may be) can appear in base forms with complements to form noun phrases, adjective phrases, and verb phrases. If this is correct, then it would be quite reasonable to expect that certain items might appear, with fixed contextual features, in more than one of these categories. The lexicalist analysis of derived nominals proposes that this expectation is fulfilled.

The lexicalist hypothesis faces additional problems, however. Consider the phrase *John's proof of the theorem,* as a typical illustration. According to the lexicalist hypothesis, the item *prove* appears in the lexicon with certain contexual features that indicate the range of complements it can accept and the choice of items that may appear in these associated phrases. Yet to be

accounted for, however, is the possessive noun phrase *John's* and its relation to the head noun *proof.* It might be suggested that the possessive noun phrase derives from a relative clause with *have,* as *John's table* might derive from the structure underlying *the table* [$_S$*John has a table*]$_S$, along lines that have been frequently discussed. Thus the source of *John's proof of the theorem* would be, in this analysis, the structure underlying *the proof of the theorem that John has.* While not implausible in this case, this approach quickly runs into difficulties when extended. Thus to account for *John's refusal to leave, John's invention of a better mousetrap,* and many other forms, it would be necessary to postulate abstract verbs that obligatorily undergo certain transformations, a dubious move at best, as noted earlier.

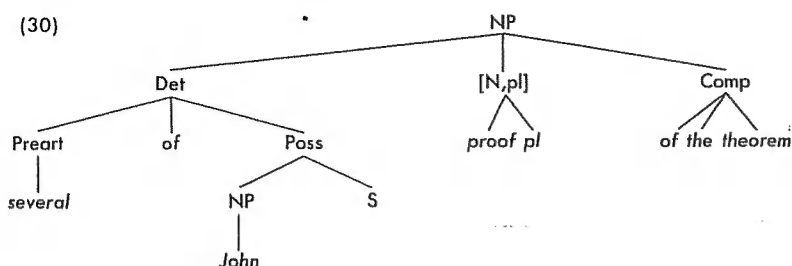
An alternative would be simply to derive the possessive noun phrase itself as a base form. Suppose, tentatively, that the rules generating determiners in the base component are the following:[25]

(29) a. Det → (Prearticle of ) Article (Postarticle)

b. Article → $\left\{\begin{matrix} \pm\text{def} \\ \text{Poss} \end{matrix}\right\}$

The noun phrase *several of John's proofs of the theorem,* under this analysis, would have a structure of roughly the following form:

(30)

```
NP
├── Det
│   ├── Preart
│   │   └── several
│   ├── of
│   └── Poss
│       ├── NP
│       │   └── John
│       └── S
├── [N,pl]
│   ├── proof
│   └── pl
└── Comp
    └── of the theorem
```

It would be analogous in structure, then, to the phrase *several of those proofs of the theorem.*

If this approach is correct, we would expect to find structures of the form NPs–N even where the N is not a derived nominal, and where the possessive construction in question does not derive from the corresponding structure: *N that NP has.* In fact, there is some evidence in support of this expectation. A number of people have noted that the distinction between alienable and inalienable possession, formally marked in certain languages, has a certain status in English as well. Thus the phrase *John's leg* is ambiguous: it can be used to refer either to the leg that John happens to have in his possession (alienable possession), that he is, say, holding under his arm; or to the leg



that is, in fact, part of John's body (inalienable possession). But the phrase *the leg that John has* has only the sense of alienable possession. We cannot say that the leg that John has hurts or that it is weak from the climb, though we can make this statement of John's leg, in the inalienable sense of the phrase *John's leg.*[26] These observations lend plausibility to the view that *John's leg* has another source in addition to the structure underlying *the leg that John has,* from which it can be derived (in the alienable sense) along the same lines as *John's table* from the structure underlying *the table that John has.* The second source, then, might be given by the base rules (29), which are semantically interpreted as specifying inalienable possession. This assumption would account for the facts just noted.

Within the framework that I am here presupposing, grammatical relations are defined by configurations in the deep structure, and selectional features relate the heads of phrases that are associated in specific grammatical relations. Then the words *John* and *proof* are the heads of the related phrases *several of John's* and *proofs of the theorem* in *several of John's proofs of the theorem,* and the same selectional feature that associates subject and verb in *John proved the theorem* will relate these two items, despite the very different syntactic origin of the relationship.[27] We return to this matter later on. For the moment, it is sufficient to point out that by a suitable generalization of the interpretation of selectional features, we can account for the fact that the selectional relation of the possessive noun phrase of the determiner to the "verbal" head of the derived nominal is the same as that of the subject to the verb of the associated verb phrase. Hence in the simplest case, all of the contextual features of the items that appear as verbs in verb phrases and as derived nouns in derived nominals will be common to the two types of context.

It must be noted that only in the *simplest* case will exactly the same contextual (and other) features be associated with an item as a verb and as a noun. In general, lexical entries involve sets of shared features, organized in complex and little understood ways, and we should expect to find the same phenomenon in the case of derived nominals, given the lexicalist hypothesis. Examples such as (31) and (32) illustrate the discrepancy of contextual features that may be found in the case of certain noun–verbs.

(31) a. our election of John (to the presidency)
b. our belief in God
c. our consideration of John for the job

(32) a. * our election of John (to be) president
b. * our belief in God (to be) omnipotent
c. * our consideration of John (to be) a fool

Reactions to these sentences vary slightly; (31), (32) represent my judgments. Given such data, lexical entries must indicate that embedded sentences are

not permitted in the complement to the nouns, although they are permitted in the complement to the associated verbs. Whatever generality there may be to this phenomenon can be extracted from individual lexical entries and presented in redundancy rules. This discrepancy in syntactic features between the noun and verb members of a noun–verb pair corresponds to the semantic discrepancies noted earlier (cf. p. 189) and like them, strengthens the lexicalist hypothesis. The appropriate device to rule out the sentences of (28) [while permitting (27)] is a lexical rule governing contextual features. To formulate such restrictions in the structure indices of transformations would be a rather complex matter.

Consider now some of the transformational rules that apply internally to complex noun phrases. Consider first such phrases as (33) through (36):

(33) a. that picture of John's
b. a picture of John's
c. several of those pictures of John's
d. several pictures of John's

(34) a. John's picture, several of John's pictures
b. the picture of John's that Bill painted

(35) a. * the picture of John's
b. * several of the pictures of John's

(36) * John's picture that Bill painted

The expressions of (35), (36) illustrate a systematic gap in this set. In general, expressions of the form (*prearticle of*) the *N of NPs* and *NPs N that S* are unnatural. The gaps illustrated by (35) and (36) are filled by (34a) and (34b), respectively.

Alongside the examples of (33) there is a superficially similar set in which *John's* is replaced by *John*: thus, *that picture of John*, etc. In this case, the phrases are presumably complex noun phrases with a "relational" head noun, like the examples of (22). The status of the analogues to (35) (namely, *the picture of John, several of the pictures of John*) is unclear. It is clear, however, that such phrases as *John's picture* [= (34a)] are ambiguous, meaning *the picture of John* or *the picture of John's*.

On just the evidence cited so far, one might propose various transformational analyses. Tentatively, let us suppose that there are three transformations, with roughly the effects of (37), (38), (39), applying in the order given:

(37) *X-the-Y picture that John has* ⟹ *X-John's-Y picture*
(38) *X-John's-Y picture* ⟹ *X-the-Y picture of John's*
(39) *X-the-Y picture of John* ⟹ *X-John's-picture*

*X* and *Y* are pre- and post-article (including the demonstrative element), respectively. There are problems in the formulation of such transformations to which we will return below. To account for the data presented above, (38) will be obligatory when *Y* contains a demonstrative element [giving (33a), (33c), for example] or when the phrase contains a relative clause [preventing (36)], and will be blocked when *Y* is null, thus excluding (35).

Consider now such derived nominals as:

(40) a. the destruction of the city
b. the proof of it
c. the murder of John

Rule (39) will apply, giving such transforms as *the city's destruction, its proof, John's murder*. The applicability of (39) to derived nominals varies in naturalness from case to case and from speaker to speaker, and must therefore be specified in part as an idiosyncratic property of lexical items, along the lines developed in Lakoff (1965). In part, the applicability of (39) is determined by the character of the noun phrase of the complement, there being certain noun phrases that do not possessivize. Whatever the detailed restrictions may be, it seems clear that the operation in question extends to derived nominals as well as to complex noun phrases with "relational" head nouns. For convenience of reference, I will refer to rule (39) as the rule of *NP-preposing*.

Let us suppose, as suggested in the references of Note 2, that the underlying structure for passives is roughly *NP–Aux–V–NP–by* Δ, where *by* Δ is an agent phrase related, in ways that are still unclear in detail, to adverbials of means and manner. The passive operation, then, is an amalgam of two steps: the first replaces Δ by the subject noun phrase; the second inserts in the position vacated by the subject the noun phrase that is to the right of the verb. Let us refer to the first of these operations as *agent-postposing*. The second bears a close similarity to the operation of NP-preposing just discussed, and perhaps the two fall under a single generalization. If so, then the second component of the passive transformation can apply independently of the first, namely, as operation (39), internally to noun phrases. Whether or not this is so, we may inquire into the possibility that the operation of agent-postposing can apply independently of the second component of the passive transformation.

Pursuing this possibility, we note first that passivizability is a property of verbs — which is natural, given that V is the only lexical category mentioned in the structure index of the transformation. We can indicate this fact, along the lines of the references cited, by associating with certain verbs the contextual feature [ — by Δ] either as a lexical property (where it is idiosyncratic) or by a redundancy rule of the lexicon (where it is subject to some regularity). Assuming, as before, that the complements of nouns are the same in principle as those of verbs, we would expect to find in deep structures complex noun phrases of the form *Det–N–NP–by* Δ, for example, such phrases as *the enemy's–[destroy,* +N]*–the city–by* Δ. The word *destroy* will be spelled

out phonologically as *destruction* in this case, and the preposition *of* inserted by a general rule applying to N–NP constructions.[28] Agent-postposing will then apply, as in the passive, giving *the destruction of the city by the enemy*. To provide this result, we need only generalize the operation so that its domain may be a noun phrase as well as a sentence, a modification of the theory of transformations that is implicit in the lexicalist hypothesis; and we must somehow account for the appearance of the definite article in the transform, just as in the case of the transformation (38). A further generalization is required by such phrases as *the offer by John*, which indicate, as is quite natural, that of the two components of the passive transformation, only NP-preposing and not agent-postposing requires the presence of an object (more generally, a noun phrase, as in the "pseudo-passives" *John was laughed at, . . . approved of*, etc.) in the position following the verb.[29]

Notice that a verb which is not passivizable, such as *marry* (in one sense) or *resemble*, will not be subject to this operation as a derived nominal. Thus *John's marriage to Mary, John's resemblance to Bill* will not transform to *the marriage to Mary by John, the resemblance to Bill by John* [though *John's offer (of amnesty) to the prisoners* does transform to *the offer (of amnesty) to the prisoners by John*]. For additional related observations, see Lees (1960). This is a confused matter, however, and conclusions cannot be drawn with any confidence.

We have now discussed two transformations that apply to complex noun phrases: agent-postposing, which gives *the destruction of the city by the enemy*, and NP-preposing, which gives *the city's destruction*. Agent-postposing is simply a generalization of one of the components of the passive transformation. NP-preposing is similar to, and may fall under a generalization of, the other component. Suppose now that we have an underlying deep structure of the form *Det–N–Comp*, where the determiner is a noun phrase (ultimately possessive, if it remains in this position) and the complement is a noun phrase followed by the agent phrase *by* Δ; for example, *the enemy–destruction–of the city–by* Δ. Applying agent-postposing, we derive *the–destruction of the city–by the enemy*, as before. If we now extend NP-preposing so that it can apply not only in the cases given before, but also before agent phrases, we derive, from the last-formed structure, the phrase *the city's destruction by the enemy*. It is important to see, then, that the latter phrase is only apparently the nominalization of a passive; if it were really the nominalization of a passive, this fact would refute the lexicalist hypothesis, since, as was emphasized earlier, it follows from this hypothesis that transforms should not undergo the processes that give derived nominals. In fact, one major empirical justification offered for the lexicalist hypothesis was that, in a number of otherwise puzzling cases, it is precisely this state of affairs that we discover. But we now see that the crucial phrases need not be regarded as nominals derived transformationally from the passive (with the auxiliary mysteriously disappearing), but can rather be explained as, in effect, passives of base-generated derived nominals, by independently motivated transformations.



Notice that agent-postposing is obligatory for certain subject noun phrases that do not permit formation of possessives. Since agent-postposing is unspecifiable for gerundive nominals, there are certain derived nominals with no gerundive counterpart, as pointed out in Note 10. Under the transformationalist hypothesis, there would be no more reason to expect agent-postposing in derived than in gerundive nominals. Hence an additional argument in support of the lexicalist hypothesis is that it provides this distinction on independent grounds.

It is possible that such derived nominals as *the necessity for John to leave, the likelihood that John will leave*, and so on might be derived by obligatory agent-postposing from the underlying noun phrases *[for John to leave]'s necessity, [that John will leave]'s likelihood*.

A minor transformational rule will replace *by* by *of* under certain conditions, permitting *the refusal to leave of those men* (or *the refusal of those men to leave*) alternating with *the refusal to leave by those men* (or *the refusal by those men to leave*). Presumably, it is this rule that applies in the case of the nominals *the growling of the lion*, etc. Some speakers apparently accept expressions such as *John's likelihood of leaving*, though to me these are entirely unacceptable. Perhaps such expressions can be derived, by an extension of NP-preposing, from *the likelihood of John leaving*. Such expressions as * *John's likelihood to leave* apparently are acceptable to no one, exactly as is predicted by the lexicalist hypothesis.

Implicit in the rules given so far is the possibility that there will be base noun phrases of the form *Det–N–NP by* Δ, where the head noun is not derived from an underlying stem that also appears as a verb, thus a case of the sort illustrated in (22). Of course, such a possibility will be realized as a well-formed surface structure only if the determiner is filled by a phrase which can ultimately appear in the agent position, replacing the symbol Δ, which will otherwise, through the filtering effect of transformations, mark the structure as not well formed. If it is true, as suggested above, that some form of "inalienable possession" is expressed by base rules generating noun phrases in the determiner position, then the possibility just sketched can be realized. That there may be structures of this sort is suggested by a fuller analysis of such phrases as *John's picture*, discussed briefly above. We noted that there are two interpretations of this phrase, one derived from the structure underlying *the picture that John has* by rule (37), and the other derived by NP-preposing, rule (39), from the complex noun phrase that would otherwise be realized as *the picture of John*. There is, however, still a third interpretation, namely, with the same meaning as *the picture that John painted*. Conceivably, this is the interpretation given to the base structure $[_{Det}$ *John's*$]_{Det}$ $[_{N}$ *picture*$]_{N}$, with a generalization of the notion "inalienable

possession" to a kind of "intrinsic connection." A similar triple ambiguity can be found in other cases, e.g., *John's story*, where John can be the subject of the story (*the story of John*), the writer (intrinsic connection), or an editor proposing the story for publication at a meeting (*the story that John has*). Notice that if *John's picture*, *John's story*, and so on are generated in the base with the sense of intrinsic connection, they will be subject to rule (38), giving *that picture of John's*, *those stories of John's*, *the story of John's that I told you about*, and so on, all with the meaning of intrinsic connection. The latter phrases will thus be two-way ambiguous, meaning *the picture that John has* or *the picture that John painted* (though not *the picture of John*), and so on. This is of course true, and gives some further support for the analysis proposed.

Now consider the base structure *Det–N–NP–by* Δ, where the determiner is realized in the base as the noun phrase *John*, the head noun as *picture*, and the noun phrase complement as *Mary*. Without the agent phrase in the base structure, this will give *John's picture of Mary* (itself of course ambiguous, since another source could have been the structure underlying *the picture of Mary that John has*).[30] With the agent phrase generated in the base, the agent-postposing transformation must apply, giving *the picture of Mary by John*. Had the complement been omitted, we would derive *the picture by John*. Agent-postposing must precede the transformation of NP-preposing that gives *the city's destruction*, or we will derive *the destruction by the city* from *the–destroy–the city*. It therefore follows that *the picture* (*of Mary*) *by John* cannot be derived from the phrase *John's picture*, which is derived in turn from *the picture of John*. Hence *the picture of Mary by John* cannot have the latter meaning. Along these lines, a number of facts fall together in what seems a quite natural way.

Consider, finally, a slightly more complicated case, namely, a structure of the form: *Det–N–NP–by* Δ*–that NP has*, where the determiner is a possessivized noun phrase. An example would be (41):

(41) **Rembrandt's portrait of Aristotle by Δ that the Metropolitan Museum has.**

Applying agent-postposing, we derive *the portrait of Aristotle by Rembrandt that the Metropolitan Museum has*. Rule (37) gives *the Metropolitan Museum's portrait of Aristotle by Rembrandt*. Rule (38) would then give the quite clumsy phrase *the portrait of Aristotle by Rembrandt of the Metropolitan Museum's*. This would be natural if the final phrase, *of the Metropolitan Museum's*, were omitted, in which case rule (39), NP-preposing, would then apply to give *Aristotle's portrait by Rembrandt*. Clearly, the rule of agent-postposing must be permitted to apply before rule (37), which forms *NP's N* from *the N that NP has*. Furthermore, the rule of agent-postposing cannot apply after rule (37). If this ordering were permitted, the underlying



structure *the portrait of Aristotle by* Δ *that the Metropolitan has* would become, by (37), *the Metropolitan's portrait of Aristotle by* Δ, and then, by agent-postposing, *the portrait of Aristotle by the Metropolitan*. Therefore the ordering of the transformations we have been discussing must be: agent-postposing, (37), (38), (39).

So far we have been exploring the possibility that complex noun phrases, which ultimately will be possessivized if not removed from the determiner by a transformation, are derived directly by base rules such as (29). We have noted, however, that when the noun phrase is removed from the determiner, an article may appear in the position that it vacated. Thus we can have *the picture of Mary by John*, *a picture of Mary by John*, *several pictures of Mary by John*, *one of the pictures of Mary by John*, etc. These facts suggest that rule (29b) is incorrect, and that it be replaced by something like (42):

(42) **Article → [±def, (NP)]**

The article, then, can be either definite or indefinite, or can be a full noun phrase with the associated feature [+definite] or [−definite]. When the noun phrase is removed from the determiner by a transformation, the feature [±definite] will remain, much as the feature [+PRO] remains in certain positions when a noun phrase is removed. [Continuing with such an analysis, we would have to stipulate that a rule that applies automatically after (37) and after (39) — hence also to NPs generated in the article position by base rules — assigns the possessive formative to the final word of the noun phrase in question.] A similar analysis would hold for derived nominals, giving such phrases as (*several of*) *the proofs of the theorem by John*, *several proofs of the theorem by John* [which is nondefinite, as we can see from the sentence *there were several proofs of the theorem* (*by John*) *in the most recent issue of the journal*], etc. When the noun phrase constitutes the full determiner in the surface structure, the feature in question must be interpreted as definite, as we can see from the impossibility of * *there were John's proofs of the theorem in the journal*, with the same interpretation.

Rule (42) is not formulable within the framework that we have so far presupposed (cf. Note 2), which takes feature complexes to be associated only with lexical categories, and permits complex symbols to dominate a sequence of elements only within the word [cf. Chomsky (1965, p. 188f.)]. It has been suggested a number of times that this restriction is too heavy and that certain features should also be associated with nonlexical phrase categories.[31] The present considerations lend further support to these proposals.

Such an extension of the theory of syntactic features suggests that the distinction between features and categories is a rather artificial one. In the earliest work in generative grammar it was assumed that the elements of the underlying base grammar are formatives and categories; each category corre-

sponds to a class of strings of formatives. This assumption was carried over from structuralist syntactic theories, which regarded a grammar as a system of classes of elements derived by analytic procedures of segmentation and classification. For reasons discussed in Chomsky (1965, Chapter 2), it was soon found necessary to depart from this assumption in the case of lexical categories. The resulting "mixed theory" had a certain technical artificiality, in that lexical categories were interpreted both as categories of the base (N, V, etc.) and as features in the lexicon (+N, +V, etc.). In fact, when the reliance on analytic procedures of segmentation and classification is abandoned, there is no reason to retain the notion of category at all, even for the base. We might just as well eliminate the distinction of feature and category, and regard all symbols of the grammar as sets of features. If the elements NP, VP, and so on are treated as certain feature complexes, then there is no incoherence in supposing that there are complex symbols of the form [+def, +NP]. Of course, it is necessary to stipulate with care the precise conditions under which complex symbols can be formed, at each level, or else the system of grammar becomes so powerful as to lose empirical interest. A number of possible restrictions suggest themselves, but I will not explore this general question any further here.

The reanalysis of phrase categories as features permits the formulation of such base rules as (42) as well as the transformational rules that were introduced in our informal discussion of complex noun phrases. It also opens up other possibilities that should be considered. For example, with this reanalysis it becomes possible, under certain restricted circumstances, to introduce new phrase structure through transformations. To illustrate with a concrete example, consider such sentences as (43), (44):

(43) A man is in the room.
(44) There is a man in the room.

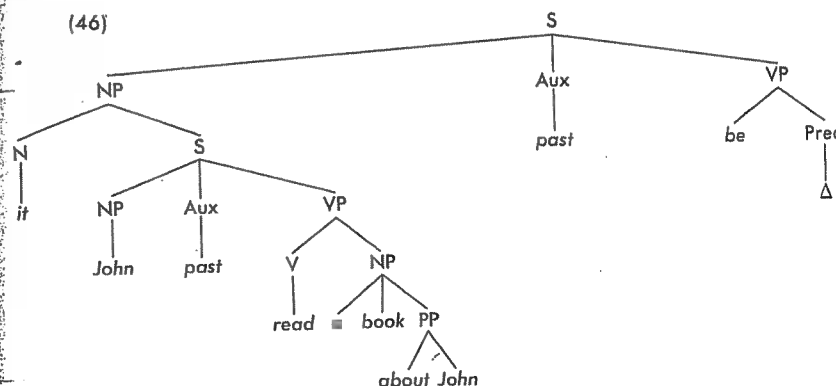
It is clear, in (44), that *there* is a noun phrase; (44) is subject to such rules, for example, as the interrogative transformation that presupposes this analysis. At the same time, there is some empirical support for the argument that (44) is derived from (43). However, these conclusions are difficult to reconcile within the theory of transformational grammar, since an item (such as *there*) introduced by a transformation can be assigned phrase structure only when it replaces some string which already has this phrase structure; and it requires some artificiality to generate (44) in this way. However, if [+NP] is a feature (or a complex of features) that can be part of a complex symbol introduced by a transformation, the difficulty is easily removed. For example, if we give to the structure underlying (43) the proper analysis (*e, e, a man, is, in the room*)[32] and apply the elementary transformation that replaces the first term by the complex symbol [*there*, +NP] (*there* standing for a feature matrix of the usual sort) and the second term by the fourth, which is then deleted, we derive a phrase-marker which is appropriate for further operations.



To take a slightly more complex example, consider such sentences as (45):

(45) a. What John did was read a book about himself.
b. What John read was a book about himself.

As noted earlier (p. 198), we might explain many of the properties of these sentences by deriving them from a base structure of roughly the form (46):

(46)
[S [NP [N it] [S [NP John] [Aux past] [VP [V read] [NP a book [PP about John]]]]] [Aux past] [VP be [Pred Δ]]]

We might then derive (45b) in the following way: Familiar rules apply to the most deeply embedded S to give *John past read a book about himself.* A new substitution transformation replaces the unspecified predicate Δ of (46) by the object of the embedded sentence, *a book about himself,* leaving a "PRO-form" in its place. This gives: *it–John past read it–past be–a book about himself.* Relativization and other familiar rules, supplemented by a rule that replaces *it that* by *what,* give (45b).

But consider now (45a). Again, the most deeply embedded S is converted to *John read a book about himself.* But in this case, the new substitution transformation replaces the unspecified predicate not by the object of the embedded sentence but by its whole verb phrase, which is replaced by a "PRO-form," *do-it,* giving *it–John past do it–past be–read a book about himself.* The remaining rules give (45a). The problem, however, is that the element *do-it* must be specified as a structure of the form V–NP. This is straightforward in the case of the "PRO-verb" *do,* but in the earlier framework there was no way to specify that *it* is a NP in the derived structure. Observe that the embedded VP is replaced by *do-it* even when it contains no NP at all, as in *what John did was read.* The argument that the introduced element *do-it* is actually of the form V–NP is greatly strengthened by other forms, for example, the sentence (47),[33] in which case passivization applies to it:

(47) John apologized more meekly than it had ever been done before.

Once again, if phrase categories are reinterpreted as features, there is no problem in formulating the required rules. The verb of the embedded VP can become *do* by an extension of the rule of *do*-insertion, and the complex symbol [*it*, +NP] is introduced by the transformation in the appropriate position.

In short, there is some motivation for the limited extension of the mechanisms for assigning derived constituent structure that results from a decision to replace categories systematically by features that can enter into complex symbols.

Continuing to explore consequences of the lexicalist hypothesis, let us return to the rules (21) which expand NP, VP, and AP into expressions containing optional complements. The phrase category "complement" seems to play no role in transformations. We can easily abolish this category if we replace the rules (21) by a single schema, with a variable standing for the lexical categories N, A, V. To introduce a more uniform notation, let us use the symbol $\bar{X}$ for a phrase containing $X$ as its head. Then the base rules introducing N, A, and V will be replaced by a schema (48), where in place of . . . there appears the full range of structures that serve as complements and $X$ can be any one of N, A, or V:

(48) $\bar{X} \rightarrow X \ldots$

Continuing with the same notation, the phrases immediately dominating $\bar{N}$, $\bar{A}$ and $\bar{V}$ will be designated $\bar{\bar{N}}$, $\bar{\bar{A}}$, $\bar{\bar{V}}$ respectively. To introduce further terminological uniformity, let us refer to the phrase associated with $\bar{N}$, $\bar{A}$, $\bar{V}$ in the base structure as the "specifier" of these elements. Then the elements $\bar{N}$, $\bar{A}$, $\bar{V}$ might themselves be introduced in the base component by the schema (49):

(49) $\bar{\bar{X}} \rightarrow$ [Spec, $\bar{X}$] $\bar{X}$

where [Spec, $\bar{N}$] will be analyzed as the determiner, [Spec, $\bar{V}$] as the auxiliary (perhaps with time adverbials associated), and [Spec, $\bar{A}$] perhaps as the system of qualifying elements associated with adjective phrases (comparative structures, *very*, etc.). The initial rule of the base grammar would then be (50) (with possible optional elements added):

(50) $S \rightarrow \bar{\bar{N}}\ \bar{\bar{V}}$.

Thus a skeletal form of the base is induced by the "primitive" categories N, A, V (which, as noted earlier, may themselves be the reflection of an underlying feature structure).

In other respects, the primitive categories might differ, for example, if V is analyzed into a copula–predicate construction. Furthermore, it can be expected that the base rules for any language will contain language-specific modifications of the general pattern. If this line of thought is correct, the

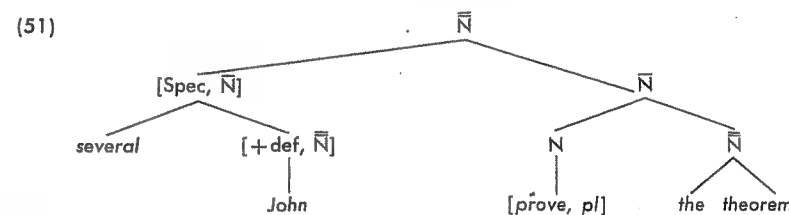
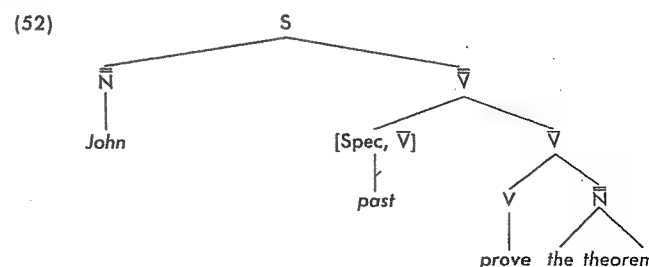


structure of derived nominals would be something like (51), and the structure of a related sentence, like (52) (omitting much detail):

(51)

$\bar{\bar{N}}$
[Spec, $\bar{N}$] — several, [+def, $\bar{\bar{N}}$] — John
$\bar{N}$ — N — [prove, pl]; $\bar{\bar{N}}$ — the theorem

(several of John's proofs of the theorem)

(52)

S
$\bar{\bar{N}}$ — John
$\bar{\bar{V}}$ — [Spec, $\bar{V}$] — past; $\bar{V}$ — V — prove; $\bar{\bar{N}}$ — the theorem

(John proved the theorem)

The internal structure of the nominal (51) mirrors that of the sentence (52). The strict subcategorization features of the lexical item *prove* take account of the phrases $\bar{V}$ and $\bar{N}$ dominating the category to which it is assigned in (51), (52), respectively. Its selectional features refer to the heads of the associated phrases, which are the same in both cases. The category $\bar{\bar{N}}$, like S, is a recursive element of the base.[34] Correspondingly, it would be natural to suppose that in the cyclic application of transformations, the phrases of the form $\bar{\bar{N}}$ play the same role as the phrases of the form S in specifying the domain of transformations.

A structure of the sort just outlined is reminiscent of the system of phrase structure analysis developed by Harris in the 1940's.[35] In Harris' system, statements applying to categories represented in the form $X^n$ ($n$ a numeral) applied also to categories represented in the form $X^m$ ($m < n$). One might seek analogous properties of the system just analyzed.

So far, we have surveyed some evidence in support of the lexicalist hypothesis and explored its consequences for grammatical theory and the analysis of English structure. As was noted, the central objection to any form of the lexicalist hypothesis in earlier work such as Lees (1960) was eliminated by

later elaborations of syntactic theory to incorporate syntactic features and a separate lexicon. Other objections remain, however. The strongest and most interesting conclusion that follows from the lexicalist hypothesis is that derived nominals should have the form of base sentences, whereas gerundive nominals may in general have the form of transforms. We have indicated that in many cases this conclusion is confirmed, and that at least some apparent counterexamples (e.g., *the city's destruction by the enemy*) can be satisfactorily explained in terms of independently motivated rules. There remain, however, certain more difficult cases. As is well-known, processes of derivational morphology are applicable in sequence — they may even be recursive.[36] But consider such expressions as (53):

(53) a. The book is readable.
b. the book's readability
c. John is self-indulgent.
d. John's self-indulgence

If the lexicalist hypothesis is accepted for the full range of derived nominals, then (53b) and (53d) must be analyzed in terms of base structures such as (51). Since *readability* and *self-indulgence* are obviously derived from *readable* and *self-indulgent*, it follows that (53a) and (53c) must in effect also be base structures rather than transforms from other structures such as, perhaps (54):

(54) a. the book is able [$_S$for the book to be read]$_S$
b. John is indulgent to John.

However, a case can be made for transformational derivation of (53a) and (53c) from something like (54a) and (54b), contradicting the lexicalist hypothesis, in this instance.

The seriousness of this objection to the lexicalist hypothesis depends on the strength of the case for the transformational derivation in question. It seems to me that the case is far from persuasive. Notice, for one thing, that the proposed transformation is not "meaning-preserving" (except in the trivialized sense discussed on p. 188), as Chapin observes. In fact, the remarks of Note 11 can be extended to these cases as well. Thus, *readable* is much more sharply restricted in meaning than *able to be read*. In a wide range of other cases the meaning is restricted or based on a very different subregularity (consider *commendable, abominable, irreplaceable, incomparable, despicable, decidable, laudable, insufferable, noticeable, changeable, pitiable, enviable, preferable, insufferable, inviolable, admirable, deplorable, adorable, irritable, lamentable, quotable, detestable, lovable, admissible, livable, laughable, honorable, valuable*, and so on).[37] It follows that any argument for the transformational analysis that is based on semantic grounds or on grounds of selectional relations will be very weak.

In fact, even in the best of cases such arguments are weak; correspondingly, since the earliest work in transformational generative grammar, the attempt has been made to support them by independent syntactic arguments. The reason is that an alternative, nontransformational approach can be envisaged if the support for transformations is simply meaning equivalence or sameness of selectional relations. Where the grounds are semantic, an alternative is an enrichment of the rules of semantic interpretation;[38] and regularities involving only selectional features might in principle be stated as redundancy rules of the lexicon.[39] For example, insofar as a subregularity exists regarding selectional rules in the case of *-able*, it can be formulated as a lexical rule that assigns the feature [*X* — ] to a lexical item [V-*able*] where V has the intrinsic selectional feature [ — *X*]. It would follow, then, that where the embedded passive in (54a) has as its grammatical subject a noun phrase that is not the underlying object (or, in the case of "pseudo-passives" such as *he can be relied on*, the "pseudo-object"), the corresponding form (53a) will be excluded. In fact, there is evidence in support of this conclusion. Thus we cannot derive *John is believable* (*imaginable, expectable*, etc.) *to have left* from *NP believes* (*imagines, expects*) *John to have left*, although a deep object such as *this claim* can appear in the context — *is believable*. There are many open questions regarding such constructions, but it seems to me that the argument for a transformational analysis of (53a) is not compelling.

What is more, the argument for a transformational analysis of (53b) from (53a) is weak on independent grounds. Thus it is difficult to see how such an analysis could account for the fact that *readability* may refer not to a fact, event, process, etc., but rather to a property; thus the phrase *the readability of the book is its only redeeming feature* does not mean (*the fact*) *that the book is readable is its only redeeming feature*. Although perhaps such difficulties can be overcome, as matters now stand, examples such as (53a), (53b) do not seem to me to offer a serious argument against the lexicalist hypothesis.

The situation seems to me similar in the case of (53c) and (53d). Examples such as (53c) seem to provide the strongest case for transformational analysis of derived forms, but even here, the matter is far from clear. Consider, for example, the sentences in (55):

(55) a. John sent a self-addressed envelope.
b. This is clearly a self-inflicted wound.
c. The prophecy is self-fulfilling.
d. Confrontations between students and administration are self-generating.
e. John is self-educated.
f. John's remarks are self-congratulatory.
g. John's actions are self-destructive.

Sentence (55a) does not mean that the envelope was addressed to itself; the phrase *self-addressed envelope* can appear in sentences where there is no

syntactic source for *self* at all (*self-addressed envelopes are barred by law from the mails*). The same is true of (55b), (55f), (55g). Sentence (55c) does not, strictly speaking, mean that the prophecy fulfilled the prophecy, which is senseless, but rather that it led to a state of affairs that fulfilled the prophecy. In the case of (55d), what is meant is that certain confrontations generate other confrontations of the same sort; confrontations do not generate themselves. (55e) cannot be derived by a rule analogous to one that purportedly forms (53c) from (54b), since the postulated underlying form, *John was educated by himself,* is ruled out by the principle, whatever it may be, that makes passives incompatible with reflexivization. A similar argument applies to (55g); the postulated underlying form, *John's actions destroy himself,* is ruled out by general conditions on reflexivization. Furthermore, a consideration of forms such as *self-conscious, self-proclaimed* (*enemy*), *self-contained, self-evident, self-esteem, self-explanatory* (i.e., needs no explanation), *self-important, self-seeking,* and so on makes one search for a general transformational analysis of such structures seem ill-conceived. The variety and idiosyncrasy of such items seem to be of the sort that is characteristic of the lexicon; it is difficult to see how they can be accounted for by syntactic rules of any generality. Furthermore, the difficulties in deriving (53b) from (53a) carry over to the pair (53c), (53d).

The discussion so far has been restricted to gerundive and derived nominals, and has barely touched on a third category with some peculiar properties, namely, nominals of the sort illustrated in (56):

(56) a. **John's refusing of the offer**
b. **John's proving of the theorem**
c. **the growing of tomatoes**

These forms are curious in a number of respects, and it is not at all clear whether the lexicalist hypothesis can be extended to cover them. That it should be so extended is suggested by the fact that these forms, like derived nominals, appear to have the internal structure of noun phrases; thus the possessive subject can be replaced by a determiner, as in (56c). On the other hand, adjective insertion seems quite unnatural in this construction. In fact, there is an artificiality to the whole construction that makes it quite resistant to systematic investigation. Furthermore, the construction is quite limited. Thus we cannot have *the feeling sad, the trying to win, the arguing about money, the leaving,* etc.

In apparent conflict with an extension of the lexicalist hypothesis is the fact that these constructions exist in the case of certain verbs that we have tentatively derived from underlying intransitives, as in the case of (56c), which is structurally ambiguous, as contrasted with the derived nominal (57), discussed on p. 192, which is unambiguous:

(57) **the growth of tomatoes**



If the lexicalist hypothesis is extended to the forms (56), then we must suppose that both *tomatoes grow* and *NP grows tomatoes* are base forms. However, to account for the interpretation of (57) as well as for the relation of transitive and intransitive *grow* we were led to regard *NP grows tomatoes* as the causative of the underlying structure *tomatoes grow.*[40] These various assumptions are mutually consistent only if we reject the analysis of the causative discussed on p. 192, which postulated the base structure (58) for *John grows tomatoes,* and assume instead that the base structure is (59):

(58) **John [+cause] [$_S$tomatoes grow]$_S$**
(59) **John [+cause, grow] tomatoes**

In other words, we postulate that there is a feature [+cause] which can be assigned to certain verbs as a lexical property. Associated with this feature are certain redundancy rules which are, in this case, universal, hence not part of the grammar of English but rather among the principles by which any grammar is interpreted. These principles specify that an intransitive with the feature [+cause] becomes transitive and that its selectional features are systematically revised so that the former subject becomes the object. Similar principles of redundancy apply to the associated rules of semantic interpretation. To account for the distinction between (56c) and (57), we must restrict the feature [+cause] with respect to the feature that distinguishes derived nominals such as *growth* from forms such as *growing,* limiting it to the latter case. Unless there are some general grounds for the hierarchy thus established, the explanation offered earlier for the nonambiguity of (57) is weakened, since it involves an *ad hoc* step. There is, nevertheless, a partial explanation and a natural way of stating a complex of facts.

To summarize, three types of nominalizations have been considered in this discussion: the gerundive nominals such as (60), the derived nominals such as (61), and the "mixed" forms (62), which to me seem rather clumsy, though quite comprehensible, when a derived nominal also exists:

(60) **John's refusing the offer**
(61) **John's refusal of the offer**
(62) **John's refusing of the offer**

On the basis of the evidence surveyed here, it seems that the transformationalist hypothesis is correct for the gerundive nominals and the lexicalist hypothesis for the derived nominals and perhaps, though much less clearly so, for the mixed forms. This conclusion has a variety of consequences for general linguistic theory and for the analysis of English structure. Such material provides a case study of the complex of problems that arise when linguistic theory is elaborated so as to incorporate both grammatical transformations and lexical features.

## NOTES

1. This work was supported in part by the U. S. Air Force [ESD Contract AF19(628)-2487] and the National Institutes of Health (Grant MH-13390-01).

2. The presupposed framework is discussed in greater detail in a number of recent publications, specifically, J. Katz and P. Postal (1964); Chomsky (1965); and references cited there.

3. Needless to say, any specific bit of evidence must be interpreted within a fixed framework of assumptions, themselves subject to question. But in this respect the study of language is no different from any other empirical investigation.

4. Henceforth I shall use labeled brackets to indicate structures in phrase-markers; an expression of the form $X[_A\ Y]_A Z$ signifies that the string Y is assigned to the category A in the string XYZ.

5. There are a number of suggestive remarks on this matter in Kenny (1963).

6. The fullest discussion of this and related topics is in Lees (1960), from which I will draw freely.

7. I follow here the proposal in Chomsky (1965, p. 222) that the base rules give structures of the form NP–Aux–VP, with Aux analyzed as $Aux_1$ (Aspect), $Aux_1$ being further analyzed as either Tense (Modal) or as various nominalization elements and Aspect as (perfect) (progressive). Forms such as * *John's being reading the book* (but not *John's having been reading the book*) are blocked by a restriction against certain *–ing –ing* sequences (compare * *John's stopping reading, John's having stopped reading*, etc.). Tense and Modal are thus excluded from the gerundive nominal, but not Aspect. Nothing that follows depends on the exact form of the rules for gerundive nominalization, but I think that a good case can be made for this analysis.

8. The transformationalist position is adopted in much recent work, for example, Lakoff (1965). It is argued in some detail in Chapin (1967). The lexicalist position is proposed in Chomsky (1965, pp. 219–220), but with the analysis of possessive subjects that is rejected here on p. 189; it is implicity rejected, incorrectly, as I now believe, in Chomsky (1965, p. 184). A compromise position of the sort noted above is developed in detail by Langendoen (1967*a*). It is also discussed in Annear and Elliot (1965). Langendoen presents an analysis very much like the one that I will propose directly, and cites a good deal of evidence in support of it. He refrains from adopting a full lexicalist position because of such ambiguities as that of *proof* in *John's proof of the theorem* (*took him a long time, is reproduced in the new text*). However, this objection to the full lexicalist hypothesis, for which I am responsible, seems to me very weak. One might just as well suppose that a lexical ambiguity is involved, analogous to the ambiguity of such words as *book, pamphlet*, etc., which can be either concrete or abstract (*the book weighs five pounds, . . . was written in a hurry*), as was noted by Postal (1966*b*). See Note 12 in this connection.

9. There are certain restrictions. For example, the transformation is inapplicable when the subject is of a type that does not permit possessives (e.g., * *that John was here's surprising me*), and it often is very unnatural with verbs that involve extraposition (* *it's surprising me that John was here,* * *John's happening to be a good friend of mine*), although *it's having surprised me that John was here* and *John's happening to be there* seem tolerable.

10. There is also at least one class of cases where the derived nominals are permitted but not the gerundive nominals, namely, examples where the gerundive is blocked because the subject does not possessivize (cf. Note 9). Thus the gerundive nominal *his negative attitude toward the proposal's disruption of our plans* is clumsy and *his bringing up of that objection's disrupting our plans* is impossible, but we can form the associated derived nominals: *the disruption of our plans by his negative attitude toward the proposal, . . . by his bringing up of that objection*. We return to these cases directly.



11. The artificiality might be reduced by deriving nominals from underlying nouns with some kind of sentential element included, where the meaning can be expressed in this way: for example, *John's intelligence* from *the fact that John is intelligent* (in *John's intelligence is undeniable*), and from *the extent to which John is intelligent* (in *John's intelligence exceeds his foresight*). It is difficult to find a natural source for the nominal, however, in such sentences as *John's intelligence is his most remarkable quality*. This idea runs into other difficulties. Thus we can say *John's intelligence, which is his most remarkable quality, exceeds his foresight;* but the appositive clause, on this analysis, would have to derive from * *the extent to which John is intelligent is his most remarkable quality*, since in general the identity of structure required for appositive clause formation to take place goes even beyond identity of the given phrase-markers, as was pointed out by Lees (1960, p. 76). Many open questions regarding recoverability of deletion in erasure transformations arise as this problem is pursued. For some discussion, see Chomsky (1965, pp. 145f., 179f.), Ross (1967*a*); and Chomsky (1968). Ross (1967*a*) suggests (Chapter 3, *n.* 19) that identity of base structures is required for erasure.

The scope of the existing subregularities, I believe, has been considerably exaggerated in work that takes the transformationalist position. For example, Lakoff (1965) gives what are probably the strongest cases for this position, but even of these very few are acceptable on the semantic grounds that he proposes as justifying them. Thus *John's deeds* does not have the same meaning as *things which John did* (p. IV-2), but rather, *fairly significant things which John did* (we would not say that one of John's first deeds this morning was to brush his teeth). We cannot derive *John's beliefs* from *what John believes* (p. V-23), because of such sentences as *John's beliefs are not mutually consistent, . . . are numerous*, etc., or *John's beliefs, some of which are amazing, . . . ;* nor can we derive it from *the things that John believes*, since the semantic interpretation will then be incorrect in such expressions as *I respect John's beliefs* or *John's beliefs are intense*. It is difficult to see how one can transformationally relate *I read all of John's writings* to *I read all of what John wrote*, in view of such expressions as *I read all of John's critical writings*, etc. And if one is to postulate an abstract verb *poetize* underlying *John's poems*, then what about *John's book reviews, dialogues, sonnets, limericks, Alexandrines*, etc.? In general, there are few cases where problems of this sort do not arise. Correspondingly, the transformationalist position is impossible to support, and difficult even to maintain, on semantic grounds.

12. It is immaterial for present purposes whether a lexical entry is regarded as a Boolean function of specified features or is to be replaced by a set of lexical entries, each of which consists of a set of specified features. It is unclear whether these approaches to problems of range of meaning and range of function are terminological variants, or are empirically distinguishable. Some of the matters touched on in Note 11 may be relevant. Consider, for example, the ambiguity of *book* and *proof* mentioned

in Note 8. Certain conditions on recoverability of deletion would lead to the conclusion that a single lexical entry is involved when two senses of the word can be combined in apposition. Under this assumption, the choice between the alternatives just mentioned in the case of *book* and *proof* would be determined by the status of such sentences as *this book, which weighs five pounds, was written in a hurry* and *John's proof of the theorem, which took him a long time, is reproduced in the new text.*

13. For discussion, see Rosenbaum (1967), and Kiparsky and Kiparsky (1967).

14. See references of Note 13.

15. This solution is proposed by Lakoff (1965, p. A-15f.), but on the transformationalist grounds that he adopts, there is no motivation for it.

16. There are many problems to be explored here. Notice, for example, that *John interested me in his ideas* is very different from *John interested me with his ideas* (both types of prepositional phrases occur in *John interested me in politics with his novel approach*); only the latter is similar in meaning to *John's ideas interested me.* A full analysis of these expressions will have to take into account instrumental phrases, concerning which there are numerous problems that have been discussed in a number of stimulating papers by Fillmore, Lakoff, and others.

The brief mention of causatives in Chomsky (1965) takes the main verb of (12) to be the verb *cause*, but the distinction between direct and indirect causation suggests that this cannot be correct. Lakoff (1966*b*) argues that the distinction between direct and indirect causation is a matter of use, not underlying structure; thus he argues that *a breeze stiffened John's arm* and *a breeze caused John's arm to stiffen* are generally used to indicate direct causation, while *a breeze brought it about that John's arm stiffened* and *a breeze made John's arm stiffen* are generally used to indicate indirect causation, but that actually either interpretation is possible, from which it would follow that the underlying verb could be taken to be *cause* in causative constructions. However, it does not seem correct to regard this simply as a distinction of use. Thus we can say *John's clumsiness caused the door to open* (*the window to break*) but not *John's clumsiness opened the door* (*broke the window*). For some discussion of this matter, see Barbara Hall (1965).

17. It is not obvious that such forms as *the reading of the book* are ordinary derived nominals. I return to this matter briefly below.

18. This was pointed out to me by M. Kajita. Notice that *his criticism of the book for its failure . . .* is grammatical. Presumably, *for*-phrases of this sort are part of the complement system for verbs and nouns.

19. I refer here to the distinction drawn in Chomsky (1965, p. 11f.). For the distinction between direct and derivative generation, see Chomsky (1965, p. 227, *n.* 2).

20. Langendoen (1967*a*) discusses a number of examples of this sort.

21. For example, such a device could be used to establish, say, that all verbs are derived from underlying prepositions. If one wishes to pursue this line of reasoning, he might begin with the traditional view that all verbs contain the copula, then arguing that *John visited England* is of the same form as *John is in England* (i.e., * *John is visit England*), where *visit* is a preposition of the category of *in* that obligatorily transforms to a verb incorporating the copula. Thus we are left with only one "relational" category, prepositions. To rule out such absurdities, it is necessary to exclude the devices that permit them to be formulated or to assign a high cost to the use of such devices.



22. Still another possibility would be to take the underlying form to be $[_{NP}$Det N$]_{NP}$ be $[_{NP}$Det N Comp$]_{NP}$ (e.g., *the question is the question whether John should leave*), with the second occurrence of the repeated noun deleted, but this too presupposes that the Det–N–Comp structures are base forms, not reduced relatives.

23. Cf., for example, Lakoff (1966*b*), Appendix A.

24. Examples from Lakoff, (1966*b*).

25. It is immaterial for the present discussion whether the structures to the right of the arrow are, indeed, base structures, or whether certain of them are derived from "deeper" or different structures. It is sufficient, for present purposes, to note that (30), or something sufficiently like it, is the general form of the determiner at some stage of derivation. What is crucial, for the present, is that the possessive noun phrase is being assigned the status of the article ±def, whatever this may be in the base structure.

26. These examples are due to John Ross.

27. If we take the structure in question to be, rather, (*several of* [(*John's*) (*proofs of the theorem*)]), the same conclusion follows, with respect now to the embedded phrase *John's proofs of the theorem.*

28. Alternatively, it has been proposed that the preposition is an obligatory part of the underlying noun phrase, and is deleted in certain contexts, for example, the context: verb — . This seems to me dubious, however. Notice that the preposition is not invariably deleted in the context verb — NP, for example, in such cases as *approve of John.* Hence we would have to postulate an idiosyncratic feature *F* that subdivides verbs into those that do and those that do not undergo *of*-deletion. An arbitrary bifurcation of the lexicon is the worst possible case, of course. No such arbitrary feature is needed if we suppose the *of* to be introduced in the context N — NP. Of course *approve* will be distinguished from *read* by the strict subcategorization features [ — PP], [ — NP] (or whatever variants of these are employed), exactly as *laugh* (*at John*) is distinguished from *see* (*John*); this, however, is not a new classification, but rather one that is necessary however the matter of *of* is handled. To make matters worse for the theory of *of*-deletion, the new, idiosyncratic feature *F* will have to cut across related senses of a single item, since we have *approve–the proposal* alongside of *approve–of the proposal.* Furthermore, there is a possibility, which should be explored, of combining the proposed rule of *of*-insertion with the rule governing placement of *of* in prenominal constructions such as *lots of work, several of the boys, a group of men,* etc. Such considerations suggest that the preposition is an inherent part of the prepositional phrase, but not of the object.

29. Such an analysis of the phrases in question is proposed by Kinsuke Hasegawa, "The Passive Construction in English," forthcoming in *Language.* Hasegawa suggests, furthermore, that the passive derives from a matrix structure containing the grammatical subject as object: thus *Bill was seen by John* would derive from something like *Bill is: John saw Bill.* Despite his arguments, I am skeptical about this proposal. A serious objection, it seems to me, is that there are phrases which can appear as grammatical subject only in the passive construction. Thus we can have *a man to do the job was found by John* from *John found a man to do the job* [cf. (22n)], but such expressions as *a man to do the job came to see me* seem highly unnatural. Similarly, there are certain idioms that undergo passivization (cf. *Aspects*, p. 190f.) although the phrase that appears as grammatical subject cannot normally appear as a deep subject (*I didn't expect that offense would be taken at that remark, advantage was*

*taken of John,* etc.). Such facts are difficult to reconcile with the proposal that the passive derives from a matrix proposition with an embedded complement.

30. Notice, then, that the transformation (37) that gives *John's picture* from *the picture that John has* will also give *John's picture of Mary* from *the picture of Mary that John has.* The transformation therefore applies not to a structure of the form *Det-N-that NP has* but rather *Det-N̄-that NP has,* where N̄ represents the expression *picture of Mary* (in *the picture of Mary that John has*) or the expression *picture* (in *the picture that John has*). We return to the status of N̄ below. On p. 197 we noted another situation in which the noun and its complement appear to form a single unit.

31. See Weinreich (1966), and McCawley (1967). Several of the arguments presented in these papers seem to me very weak, however. For example, McCawley argues that indices must be assigned to full noun phrases rather than to nouns, as suggested in *Aspects.* But this argument follows from an assumption which I see no reason to accept, namely, that in the theory outlined by Chomsky (1965), an index must be assigned to the noun *hat* in such sentences as *John bought a red hat and Bill bought a brown one.* This assumption in turn follows from a theory of indices as referents which I find unintelligible, since it provides no interpretation, so far as I can see, for the case in which nouns are used with no specific intended reference, or for plurals of indefinite or infinite reference, and so on. Until these matters are cleared up, I see no force to McCawley's contention.

32. Where *e* is the identity element. To be more precise, the structural description of the transformation would have to provide further information, but this goes beyond the detail necessary to clarify the point at issue. One might extend this operation of *there*-insertion, introducing the complex symbol [*there,* +NP, *α plural*] ($\alpha = +$ or $\alpha = -$), where the third term in the proper analysis (*a man,* in the cited example) is [*α plural*], plurality now being regarded as a feature that ascends from a head noun to the NP node dominating it. This would make it possible for the rule of *there*-insertion to precede the rule of number agreement. It would also make possible the derivation of *there are believed to be CIA agents in the university* from *it is believed* [*there to be CIA agents in the university*] just as *CIA agents are believed to be in the university* might derive from *it is believed* [*CIA agents to be in the university*], along lines described in Rosenbaum (1967).

33. Brought to my attention by John Ross.

34. The same conclusion is argued on different grounds by Lakoff and Peters (1966). Further evidence that transformations apply to the domain N̄ is provided by the fact (pointed out to me by John Ross) that extraposition from the determiner takes place inside a noun phrase, as in: *one of the boys who are here who is a friend of mine.*

35. Harris (1951, Chapter 16).

36. Some examples are discussed by Chapin (1967), which presents the case for the transformationalist hypothesis on the grounds to which we now briefly turn.

37. There are also, of course, many cases where there is no possible base form such as (54a), e.g., *probable, feasible, (im)practicable, formidable, peaceable, knowledgeable, perishable, appreciable, sociable, flexible, amiable, variable, actionable, amenable, reasonable, seasonable, personable, miserable, venerable, inexorable, favorable, pleasurable, palatable, tractable, delectable, ineluctable, salable, habitable, creditable, profitable, hospitable, charitable, comfortable, reputable, irascible, incredible, audible, legible, eligible, negligible, intelligible, indelible, horrible, visible, sensible, responsible, accessible, possible, plausible, compatible.*



38. Such an alternative is of course programmatic insofar as semantic interpretation remains obscure. But the necessity for rules that relate deep structures to (absolute) semantic interpretations seems clear, and it is dangerous to base any argument on the fact that we know little about such rules. If we knew nothing about phonology, it would be tempting to try to account for phonetic form by much more elaborate syntactic processes. Knowing something about phonology, we can see why this step is ill-advised.

39. As was pointed out to me by E. Klima.

40. An alternative analysis that derives *tomatoes grow* from *NP grows tomatoes* is implausible, since it would imply that *children grow* derives from * *NP grows children.* See Chomsky (1965, p. 214).